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Overview on grassland and farming systems in Evros regional unit

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Abstract. Agriculture is the most important activity of the economy in Evros regional unit followed by livestock farming. Arable land covers 42.35% of the total area. The main cultivation is sunflower representing around 50% of the total production in Greece. Forage crops production is limited and consists mainly of alfalfa. Livestock usually graze at natural and semi-natural grasslands and woodlands. Inappropriate grazing management due to the lack of grazing management plans led to overgrazing or land abandonment. High yielding forage crops are necessary to provide the animal feed. An essential increase in artificial pastures cultivated with drought-resistant grasses and legumes will be a step to combine agricultural and livestock production. Grassland management plans are important in order to sustain grassland and woodland ecosystems and to increase livestock production.

Keywords. Forage production – Grasslands – Grazing – Greece – Thrace.

Vue d'ensemble sur les systèmes herbagers et les systèmes agricoles dans l'unité régionale d'Evros

Résumé. L'agriculture est l'activité la plus importante de l'économie dans la province d'Evros suivie par l'élevage. Les terres arables couvrent 42,35% du total de la zone. La principale culture est le tournesol représentant environ 50% de la production totale en Grèce. La production de cultures fourragères est limitée et consiste principalement en luzerne. Le bétail broute habituellement dans des pâturages herbeux ou boisés naturels ou semi-naturels. Une gestion inappropriée du pâturage en raison de l'absence de plans de gestion de pâturage conduit au surpâturage ou à l'abandon de terres. Les cultures fourragères à haut rendement sont nécessaires pour fournir l'alimentation animale. Une augmentation essentielle de pâturages artificiels cultivés avec des herbes résistantes à la sécheresse et des légumineuses sera une étape pour combiner la production agricole et animale. Les plans de gestion des prairies sont importants afin de maintenir les écosystèmes des régions boisées et des terres herbeuses et d'accroître la production de bétail.

Mots-clés. Production de fourrage – Prairies – Pâturages – Grèce – Thrace.

I – Introduction

Greece is divided in 74 regional units. Evros regional unit (part of Thrace region) is a less favored area located in the northeastern part of Greece. It borders Turkey to the east across the river Evros and Bulgaria to the north and the northwest (Fig 1). Evros is a lowland region, as 62.4% of its area consists of plains. Agriculture is the most important activity of the local economy. The crop production includes mainly winter cereals (as wheat and barley), sunflowers, cotton, maize and alfalfa. Traditionally, extensive livestock farming is a fundamental activity, especially for the north part of Evros region (Parissi *et al.*, 2010). Sheep and goats farming is the most important activity in the animal production sector of Evros.



Fig. 1. Location and map of Evros regional unit.

II – Land use cover and farming systems in Evros region

The total area of Evros regional unit is 424,800 hectares. Arable land covers 42.35% (Table 1) (HSA, 2000). Thus, Evros regional unit ranks among the top regional units of Greece in terms of the ratio of cultivated lands to total area, representing 5.38% of the total agricultural land in Greece (Table 2). After agricultural lands, forest and other non-cultivated lands are predominant. Pastures cover only 4.29%, but grazing is a common activity in open oak woodlands, shrublands, as well as in forests (Table 1). This means that the area used for livestock production in Evros exceeds 35% of the total area.

Table 1. Land uses at Evros regional unit

| | Evros Prefecture | % of Evros |
|----------------------------|---------------------|---------------|
| Agricultural Land | 240,000 | 56.50 |
| Arable land | 179,900 | 42.35 |
| Permanents crops | 5,350 | 1.26 |
| Pastures - Grazing lands | 18,250 | 4.29 |
| Other agricultural area | 36,500 | 8.59 |
| Woodlands - Forests | 166,170 | 39.12 |
| Forests | 99,840 | 23.50 |
| Open woodlands | 37,290 | 8.78 |
| Shrublands | 29,040 | 6.29 |
| Fresh water | 12,880 | 3.03 |
| Artificial areas | 5,750 | 1.35 |
| TOTAL | 424,800 | 100.00 |

Source: Hellenic Statistical Authority (HSA) (2000).

Table 2. Number of agricultural and livestock enterprises in Greece and in Evros regional unit

| | Mixed agricultural and livestock enterprises | | Agricultural enterprises | | Livestock enterprises | |
|---------------------|--|----------------|--------------------------|----------------|-----------------------|----------------|
| | Number | Land area (ha) | Number | Land area (ha) | Number | Land area (ha) |
| Greece | 115,461 | 1,172,200 | 575,525 | 2,091,000 | 18,463 | 118,400 |
| Evros regional unit | 2,178 | 30,300 | 12,040 | 112,600 | 98 | 700 |
| % of Greece | 1.89 | 2.58 | 2.09 | 5.38 | 0.53 | 0.59 |

Source: Hellenic Statistical Authority (HSA) (2013a).

High-quality plants such as sunflower, wheat, cotton, sugar beet corn and some vegetables are grown in Evros (Table 3). Sunflower cultivation covers more than a fifth of the total cultivated land in Evros. It is by far the dominant crop in the northern part of Evros. It has to be noted that around 50% of sunflower cultivation area in Greece is located in Evros. Forage crops production is limited and consists mainly of alfalfa.

Table 3. Important crops in Evros (2014)

| | Area (ha) | % |
|------------------------------|-----------|------|
| Sunflower | 30,930.5 | 21.9 |
| Wheat | 28,311.4 | 20.0 |
| Other winter cereals | 18,041.4 | 12.8 |
| Cotton | 20,341.5 | 14.4 |
| Alfalfa | 10,128.3 | 7.2 |
| Maize | 3,224.3 | 2.3 |
| Vegetable | 2,260.5 | 1.6 |
| Sugar beet | 1,709.4 | 1.2 |
| Other crops and fallow lands | 26,554.1 | 18.8 |
| TOTAL | 141,501.4 | 100 |

Source: Statistics from the Directorate of Rural Economy and Veterinary of Regional Unit of Evros (2014).

III – Grassland farming and livestock farming in Evros

The total number of livestock and mixed enterprises in Evros is around the national mean (Table 2). The number of goats in Evros is also around the national mean, while cattle and horses exceed it (Table 4) mainly due to the plain topography. Extensive livestock farming of goats and sheep is dominant in the area, while cattle are mainly dairy cows (Table 4 and 5). In order to increase sustainability and profitability, high-quality forage production should be encouraged and supported as the 70-80% (depending on the type of farming system) of capital cost in farming management is related to the purchase or production of feed (Manousidis *et al.*, 2012). The establishment of artificial pastures could also contribute to a more sustainable intensive dairy sheep farming system (Manousidis *et al.*, 2011).

Forage crops are produced in about 10,600 hectares in Evros and this value corresponds to 7.2% of total cultivated area. The dominant forage crop is alfalfa (Table 6), following the same trend of the country. Availability of local seeds and traditional knowledge of farmers are among the main reasons for its dominance (Abraham *et al.*, 2009). The majority of forage crops are cultivated for hay production, while artificial pastures for grazing are covering only 0.4% of the total forage crop area. Thus, grazing is practiced in natural and semi-natural grasslands and

woodlands. They are mainly public lands. The forage production in these grazing lands and the grazing capacity are generally low (Parissi *et al.*, 2010).

Table 4. Number of livestock animals (heads) in Evros and Greece

| | Cattle | Water buffalo | Sheep | Goats | Horses |
|------------------|---------|---------------|-----------|-----------|--------|
| Greece | 614,992 | 5,479 | 8,686,117 | 3,654,793 | 26,239 |
| Evros Prefecture | 19,138 | 0 | 115,605 | 71,690 | 959 |
| % of Greece | 3.11 | 0 | 1.33 | 1.96 | 3.65 |

Source: Hellenic Statistical Authority (HSA) (2013b).

Table 5. Milk and feta cheese production in Evros and Greece (2014)

| | Cow | Sheep | Goat | Feta cheese* |
|------------------|-------------|-------------|-------------|--------------|
| Greece | 617,131,608 | 538,164,571 | 126,494,814 | 91,698 |
| Evros Prefecture | 17,794,878 | 3,683,349 | 2,270,754 | 1,268 |
| % of Greece | 2.88 | 0.68 | 1.80 | 1.38 |

Source: Hellenic Organization of Milk and Meat (ELOGAK) (2014). *2008.

Table 6. Forage crops in Evros

| | Area (ha) | % |
|----------------|-----------|------|
| Alfalfa | 10,128 | 94.8 |
| Clover | 237 | 2.2 |
| Vetch | 177 | 1.7 |
| Maize (silage) | 12 | 0.1 |
| Grasses | 39 | 0.4 |
| Barley – Oat | 83 | 0.8 |
| TOTAL | 10,678 | 100 |

Source: Statistics from the Directorate of Rural Economy and Veterinary of Regional Unit of Evros (2014).

Grazing period for sheep and goats lasts 9 to 10 months. Animals kept indoors only during the winter months and are fed mainly on alfalfa hay (Manousidis *et al.*, 2014). Due to the deficit of green and nutritious herbaceous forages during summer goats browse woody species especially oak (Manousidis *et al.*, 2016).

IV – Grassland management in Evros

Grazing management in Evros, as well as in Greece, is very poor, practically is absent (Papachristou, 2016). Inappropriate grazing management might be either land abandonment or overgrazing (Bouju, 2000). Abandonment of grasslands commonly leads to encroachment and development of woody vegetation, with increased wildfire risk (Moreira *et al.*, 2011) and reduction in floristic diversity (Bartolome *et al.*, 2005). This phenomenon is common in some grasslands of northern Evros, which are encroached by *Juniperus oxycedrus*. Heavy encroachment of this less palatable species decreases forage production and floristic diversity (Kyriazopoulos *et al.*, 2012).

Grasslands and woodlands in Greece are used in a communal way, as they are either state-owned or community-owned, and this arrangement also leads to their degradation due to

overgrazing (Papanastasis, 2009). The use of publicly owned lands as grazing lands is often associated with the absence of monitoring and planning of stocking rates. Overgrazing in various areas in northern Evros has been reported (Parissi, 2010). In contrast, there is evidence that moderate grazing intensity results in an increased floristic biodiversity in grasslands (Keisoglou *et al.*, 2013) and oak woodlands (Lempesi *et al.*, 2013) of Evros.

Greece has been pushed through to change legislation about grassland management due to the new CAP reform (2014-2020). According to the new laws (2014, 2015) grassland management plans are obligatory. This management plans will be useful tools for the sustainable grassland management in the future.

V – Conclusions

Crop production dominates the livestock production in Evros regional unit. Nevertheless, forage crops production is generally low. The combination of limited and degraded grasslands with the low production of forage crops is resulting in an increased cost of animal feed. Therefore, high yielding forage crops are necessary to provide the animal feed. An essential increase in artificial pastures cultivated with drought-resistant grasses and legumes will be a step to combine agricultural and livestock production. Grassland management plans are important in order to sustain grassland and woodland ecosystems and to increase livestock production.

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